

## WHAT IS CLAIMED IS

1. A method for managing resources provided for clients by services in a distributed  
5 computing environment, comprising:

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a client process obtaining lease access to a resource provided by a service,  
wherein said client process is operatively coupled to a client message  
endpoint configured to send messages to and receive messages from said  
service;

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said client message endpoint receiving a lease renewal request message, wherein  
said lease renewal request message references said resource provided by  
said service; and

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said client message endpoint sending a lease renewal response message, wherein  
said lease renewal response message requests renewal of said lease access  
to said resource provided by said service;

wherein said receiving a lease renewal request message and said sending a lease  
renewal response message are performed automatically by said client  
message endpoint without intervention by said client process.

2. The method as recited in claim 1, further comprising:

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said service receiving said lease renewal response message; and

said service renewing said lease access to said referenced resource in response to  
said receiving said lease renewal response message.

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3. The method as recited in claim 1,

wherein said lease access is obtained for a first granted lease period; and

5 wherein said lease renewal response message requests renewal of said lease access  
for a second lease period.

4. The method as recited in claim 3, further comprising:

10 said service receiving said lease renewal response message; and

said service granting said lease access to said referenced resource for a second  
granted lease period in response to said receiving said lease renewal  
response message.

15 5. The method as recited in claim 3, wherein said second granted lease period is less  
than or equal to said requested second lease period.

20 6. The method as recited in claim 1, wherein said lease renewal response message  
requests shared lease access to said resource, wherein shared lease access allows other  
client processes to obtain lease access to said resource contemporarily with said client  
process.

25 7. The method as recited in claim 1, wherein said lease renewal response message  
requests exclusive lease access to said resource, wherein exclusive lease access prevents  
other client processes from obtaining lease access to said resource contemporarily with  
said client process.

8. The method as recited in claim 1,

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wherein said service is a space service, wherein said space service comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client processes to resources provided by a corresponding service;

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wherein said client process is a service, wherein said plurality of service advertisements includes a service advertisement corresponding to said service; and

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wherein said lease access to said resource is lease access for publishing of said service advertisement, wherein, during said publishing, said service advertisement is accessible to client processes of said space service.

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9. The method as recited in claim 1, wherein said service is a space service, wherein said space service comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client processes to resources provided by a corresponding service, and wherein said resource is one of said plurality of service advertisement corresponding to a first service.

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10. The method as recited in claim 1, wherein said messages are in a data representation language.

11. The method as recited in claim 10, wherein said data representation language is eXtensible Markup Language (XML).

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12. A method for managing resources provided for clients by services in a distributed computing environment, comprising:

a client process obtaining access to a resource provided by a service for a first granted lease period, wherein said client process is operatively coupled to a client message endpoint configured to send messages to said service;

5       said client message endpoint sending, prior to said first granted lease period expiring, a lease renewal message, wherein said lease renewal message requests access to said resource provided by said service for a second lease period;

10      wherein said sending a lease renewal message is performed automatically by the client message endpoint without client process intervention.

13.     The method as recited in claim 12, further comprising:

15      said service receiving said lease renewal message; and

          said service granting access to said referenced resource for a second granted lease period in response to said receiving said lease renewal response message.

20     14.    The method as recited in claim 13, wherein said second granted lease period is less than or equal to said requested second lease period.

25     15.    The method as recited in claim 13, further comprising said service sending to said client message endpoint a lease renewal response message advising said client process of said second granted lease period.

16.     The method as recited in claim 12, further comprising:

30      said client process accessing a service advertisement for enabling access by client processes to resources provided by said service, said service advertisement

comprising:

a message schema comprising descriptions of messages for managing leases of resources provided by said service; and

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an address for said service receiving said messages for managing leases of resources provided by said service.

17. The method as recited in claim 16, further comprising said client message endpoint generating said lease renewal message in accordance with a description of said lease renewal message comprised in said descriptions of messages.

10 18. The method as recited in claim 16, wherein said lease renewal message is sent by said client message endpoint to said address for said service receiving said messages.

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19. The method as recited in claim 16, wherein said address is a Uniform Resource Identifier (URI).

20 20. The method as recited in claim 12,

wherein said service is a space service, wherein said space service comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client processes to resources provided by a corresponding service;

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wherein said client process is a service, wherein said plurality of service advertisements includes a service advertisement corresponding to said service; and

30 wherein said lease access to said resource is lease access for publishing of said

service advertisement, wherein, during said publishing, said service advertisement is accessible to client processes of said space service.

21. The method as recited in claim 12, wherein said service is a space service,  
5 wherein said space service comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client processes to resources provided by a corresponding service, and wherein said resource is one of said plurality of service advertisement corresponding to a first service.

10 22. The method as recited in claim 12, wherein said messages are in a data representation language.

15 23. The method as recited in claim 22, wherein said data representation language is eXtensible Markup Language (XML).

24. A distributed computing system, comprising:

a service device; and

20 a client device comprising:

a client process executable within said client device; and

25 a client message endpoint executable within said client device and operatively coupled to said client process, wherein said client message endpoint is configured to send messages to and receive messages from said service device;

30 wherein said client process is configured to:

obtain lease access to a resource provided by said service device;

wherein said client message endpoint is configured to:

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receive a lease renewal request message, wherein said lease renewal request message references said resource provided by said service device; and

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send a lease renewal response message, wherein said lease renewal response message requests renewal of said lease access to said resource provided by said service device; and

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wherein said receiving a lease renewal request message and said sending a lease renewal response message are performed automatically by said client message endpoint without intervention by said client process.

25. The system as recited in claim 24, wherein said service device is configured to:

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receive said lease renewal response message; and

renew said lease access to said referenced resource in response to said receiving said lease renewal response message.

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26. The system as recited in claim 24,

wherein said lease access is obtained for a first granted lease period; and

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wherein said lease renewal response message requests renewal of said lease access for a second lease period.

27. The system as recited in claim 26, wherein said service device is configured to:

receive said lease renewal response message; and

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grant said lease access to said referenced resource for a second granted lease period in response to said receiving said lease renewal response message.

10 28. The system as recited in claim 24, wherein said lease renewal response message requests shared lease access to said resource, wherein shared lease access allows other client devices to obtain lease access to said resource contemporarily with said client device.

15 29. The system as recited in claim 24, wherein said lease renewal response message requests exclusive lease access to said resource, wherein exclusive lease access prevents other client devices from obtaining lease access to said resource contemporarily with said client device.

20 30. The system as recited in claim 24, wherein said service device is a space service device, wherein said space service device comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client devices to resources provided by a corresponding service device, and wherein said resource is one of said plurality of service advertisement corresponding to a first service device.

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31. The system as recited in claim 24, wherein said messages are in a data representation language.

32. The system as recited in claim 31, wherein said data representation language is eXtensible Markup Language (XML).

5 33. A distributed computing system, comprising:

a service device; and

a client device comprising:

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a client process executable within said client device; and

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a client message endpoint executable within said client device and operatively coupled to said client process, wherein said client message endpoint is configured to send messages to and receive messages from said service device;

wherein said client process is configured to:

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obtain lease access to a resource provided by said service device;

wherein said client message endpoint is configured to:

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send, prior to said first granted lease period expiring, a lease renewal message, wherein said lease renewal message requests access to said resource provided by said service device for a second lease period;

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wherein said sending a lease renewal message is performed automatically by the client message endpoint without client process intervention.

34. The system as recited in claim 33, wherein said service device is configured to:

receive said lease renewal message; and

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grant access to said referenced resource for a second granted lease period  
in response to said receiving said lease renewal response message.

35. The system as recited in claim 34, wherein said service device is further  
10 configured to send to said client message endpoint a lease renewal response message  
advising said client process of said second granted lease period.

36. The system as recited in claim 33, wherein said client device is further operable  
to:

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access a service advertisement for enabling access by client devices to resources  
provided by said service device, said service advertisement comprising:

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a message schema comprising descriptions of messages for managing  
leases of resources provided by said service device; and

an address for said service device receiving said messages for managing  
leases of resources provided by said service device;

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wherein said client message endpoint is further operable to:

generate said lease renewal message in accordance with a description of  
said lease renewal message comprised in said descriptions of  
messages; and

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wherein said lease renewal message is sent by said client message endpoint to said address for said service device receiving said messages.

37. The system as recited in claim 36, wherein said address is a Uniform Resource  
5 Identifier (URI).

38. The system as recited in claim 33, wherein said service device is a space service device, wherein said space service device comprises a plurality of service advertisements, wherein each service advertisement comprises information to enable access by client  
10 devices to resources provided by a corresponding service device, and wherein said resource is one of said plurality of service advertisement corresponding to a first service device.

39. The system as recited in claim 33, wherein said messages are in a data  
15 representation language.

40. The system as recited in claim 39, wherein said data representation language is eXtensible Markup Language (XML).

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41. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

25 a client process obtaining lease access to a resource provided by a service, wherein said client process is operatively coupled to a client message endpoint configured to send messages to and receive messages from said service;

30 said client message endpoint receiving a lease renewal request message, wherein said lease renewal request message references said resource provided by

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said service; and

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said client message endpoint sending a lease renewal response message, wherein  
said lease renewal response message requests renewal of said lease access  
to said resource provided by said service;

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wherein said receiving a lease renewal request message and said sending a lease  
renewal response message are performed automatically by said client  
message endpoint without intervention by said client process.

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42. The carrier medium as recited in claim 41, wherein the program instructions are  
further computer-executable to implement:

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said service receiving said lease renewal response message; and

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said service renewing said lease access to said referenced resource in response to  
said receiving said lease renewal response message.

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43. The carrier medium as recited in claim 41,

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wherein said lease access is obtained for a first granted lease period; and

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wherein said lease renewal response message requests renewal of said lease access  
for a second lease period; and

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wherein the program instructions are further computer-executable to implement:

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said service receiving said lease renewal response message; and

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said service granting said lease access to said referenced resource for a

second granted lease period in response to said receiving said lease renewal response message.

44. The carrier medium as recited in claim 41, wherein said messages are in a data  
5 representation language.

45. The carrier medium as recited in claim 44, wherein said data representation language is eXtensible Markup Language (XML).

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46. A carrier medium comprising program instructions, wherein the program instructions are computer-executable to implement:

15 a client process obtaining access to a resource provided by a service for a first granted lease period, wherein said client process is operatively coupled to a client message endpoint configured to send messages to said service;

20 said client message endpoint sending, prior to said first granted lease period expiring, a lease renewal message, wherein said lease renewal message requests access to said resource provided by said service for a second lease period;

25 wherein said sending a lease renewal message is performed automatically by the client message endpoint without client process intervention.

47. The carrier medium as recited in claim 46, wherein the program instructions are further computer-executable to implement:

said service receiving said lease renewal message; and

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5 said service granting access to said referenced resource for a second granted lease period in response to said receiving said lease renewal response message; and

5 said service sending to said client message endpoint a lease renewal response message advising said client process of said second granted lease period.

48. The carrier medium as recited in claim 46, wherein said service is a space service, wherein said space service comprises a plurality of service advertisements, wherein each 10 service advertisement comprises information to enable access by client processes to resources provided by a corresponding service, and wherein said resource is one of said plurality of service advertisement corresponding to a first service.

49. The carrier medium as recited in claim 46, wherein said messages are in a data 15 representation language.

50. The carrier medium as recited in claim 49, wherein said data representation language is eXtensible Markup Language (XML).

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